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What is claimed is:

1. A three-dimensional (3D) multi-foldable device comprising:

at least four units, each of the at least four units including a center panel with two parallel edges and a pair of wing panels, the wing panels of each unit being rotatable by 180 degrees about the two parallel edges of their respective center panels, the parallel edges acting as rotation axes for the pair of wing panels, wherein the rotation axes of the first and second units are coincident and the rotation axes of the third and fourth units are coincident, and the rotation axes of the first and second units are perpendicular to the rotation axes of the third and fourth units, and at least some portions of the pair of third wing panels are combined with the first and second wing panels on one side of the pairs of the first and second wing panels, and at least some portions of the pair of the fourth wing panels are combined with the first and second wing panels on the other side of the pairs of the first and second wing panels.

2. The 3D multi-foldable device of claim 1, wherein each of the first through fourth units is a rectangle in which a width of each of the first through fourth center panels is equal to a sum of the widths of its corresponding pair of the first through fourth wing panels, and the third and fourth units completely overlap with the first and second units when the 3D multi-foldable device is in an unfolded condition.

3. The 3D multi-foldable device of claim 1, wherein, each of the first through fourth units is a rectangle and a width of each of the first through fourth center panels is equal to a sum of widths of a corresponding pair of the first through fourth wing panels, and the third unit overlaps only with first and second wing panels at one side of the pairs of the first and second wing panels and the fourth unit overlaps only with first and second wing panels at the other side of the pairs of the first and second wing panels when the 3D multi-foldable device is in an unfolded condition.

4. The 3D multi-foldable device of claim 1, further comprising:

magnetic materials on at least some portions of contacting surfaces between each of the first through fourth center panels and a corresponding pair of the first through fourth wing panels.

5. The 3D multi-foldable device of claim 1, further comprising:

a magnet on one side and a magnetic material on another side of the 3D multi-foldable device so that a plurality of 3D multi-foldable devices are connectable to each other in series, or in parallel.

6. 3D multi-foldable device of claim 1, wherein the first unit and the second unit are formed in a first line and the third unit and the fourth unit are formed in a second line, the first line and the second line being perpendicular to each other when the 3D multi-foldable device is in an unfolded condition.

7. A three-dimensional (3D) multi-foldable device comprising:

a first unit having a first center panel and a pair of first wing panels, the pair of first wing panels being rotatable by 180° about two parallel edges of the first center panel, the two parallel edges of the first center panel acting as rotation axes for the pair of first wing panels;

a second unit having a second center panel and a pair of second wing panels, the pair of second wing panels being rotatable by 180° about two parallel edges of the second center panel, the two parallel edges of the second center panel acting as rotation axes for the pair of second

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wing panels, wherein the rotation axes of the second unit are identical to the rotation axes of the first unit;

a third unit having a third center panel and a pair of third wing panels, the pair of third wing panels being rotatable by 180° about two parallel edges of the third center panel, the two parallel edges of the third center panel acting as rotation axes for the pair of third wing panels; and

a fourth unit having a fourth center panel and a pair of fourth wing panels, the pair of fourth wing panels being rotatable by 180° about two parallel edges of the fourth center panel, the two parallel edges of the fourth center panel acting as rotation axes for the pair of fourth wing panels, wherein the rotation axes of the fourth unit are identical to the rotation axes of the third unit,

wherein the rotation axes of the first and second units are perpendicular to the rotation axes of the third and fourth units, and at least some portions of the pair of the third wing panels are combined with the first and second wing panels at one side of the pairs of the first and second wing panels, and at least some portions of the pair of the fourth wing panels are combined with the first and second wing panels at the other side of the pairs of the first and second wing panels.

8. The 3D multi-foldable device of claim 7, wherein each of the first through fourth units is a rectangle in which a width of each of the first through fourth center panels is equal to a sum of widths of its corresponding pair of the first through fourth wing panels, and the third and fourth units completely overlap with the first and second units when the 3D multi-foldable device is in an unfolded condition.

9. The 3D multi-foldable device of claim 7, wherein, each of the first through fourth units is a rectangle and a width of each of the first through fourth center panels is equal to a sum of widths of a corresponding pair of the first through fourth wing panels, and the third unit overlaps only with first and second wing panels at one side of the pairs of the first and second wing panels and the fourth unit overlaps only with first and second wing panels at the other side of the pairs of the first and second wing panels when the 3D multi-foldable device is in an unfolded condition.

10. The 3D multi-foldable device of claim 7, further comprising:

magnetic materials on at least some portions of contacting surfaces between each of the first through fourth center panels and a corresponding pair of the first through fourth wing panels.

11. The 3D multi-foldable device of claim 7, wherein at least a portion of the first through fourth center panels and the pairs of the first through fourth wing panels includes one of a display panel, a touch screen, and a display panel having a haptic function.

12. The 3D multi-foldable device of claim 7, wherein the multi-foldable device is configured to be used as at least one of a mobile phone, an MPEG audio layer-3 (MP3) player, an audio recorder, a digital multimedia broadcasting (DMB) player, a car navigator, a portable personal computer (PC), a bio healthcare device, a remote controller, a camera, and a camcorder.

13. The 3D multi-foldable device of claim 7, wherein at least a portion of the first through fourth center panels and the pairs of the first through fourth wing panels includes at least one of an antenna, a speaker, a wireless charger, a universal serial bus (USB) device, a clip-type Bluetooth device, a blood pressure meter, a blood glucose meter, a thermometer, a chemical sensor, a solar battery, a self-energy generator, and a radio frequency (RF) device.